

Serial Number: 10/705,434
Via Facsimile: 571-273-8300

Attorney Docket No.: 30772-033
Date of Facsimile: May 31, 2006

Remarks

Claims 1, 31-32 and 44 are here amended, and claim 4 is canceled.

Support for amendment to claim 1 is found in claims 1 and 4 as originally filed.

Support for amendment to claims 31 and 32 is found in these claims and in claim 4 as originally filed, and in Fig. 19. Claim 44 is amended to correct a clerical error. Support is found in claims 31, 32 and 44 as originally filed.

No new matter is added, and no claims are added that would require additional search on the part of the Examiner. Upon entry of this amendment, claims 1-3 and 5-51 are pending.

Applicants believe that a brief description of the subject matter of independent claims 1 and 31, each as here amended, and claim 14 as originally filed, would be useful prior to a discussion of the cited prior art.

Claim 1 as here amended is directed to a method for reading an array of detectors contained in a device, the method having steps of: illuminating each of the detectors of the array using a plurality of electromagnetic beams arranged in an array, the device being a microfluidics device in which is contained the array of detectors, such that at least one electromagnetic beam illuminates at least one of the detectors of the array; and sensing the plurality of electromagnetic beams reflected from the detectors.

Claim 14 is directed to an apparatus for reading an array of detectors contained in a microfluidics device, the apparatus having a housing with an opening to receive the microfluidics device; an array of illuminators positioned in the housing such that each illuminator is configured to illuminate at least one of the detectors in the array of detectors; and a position-sensing device in the housing positioned to receive at least one electromagnetic beam reflected from the detectors.

Claim 31 as here amended is directed to a n illuminator for generating an array of electromagnetic beams for reading a plurality of detectors, the illuminator having a plurality of vertical cavity surface emitting lasers (VCSELs), a circuit with electronics and control, and a housing, in which the illuminator includes the plurality of VCSELs connected in the circuit within the housing, and the VCSELs generate the array of electromagnetic beams, and in which the detectors are an array of microcantilevers within a microfluidics device.

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Claims as amended are novel

The Office action on page 5, paragraph 6 rejects claims 1-3, 5-6 and 31-32 as anticipated under 35 U.S.C. §102 (b) by Prater, C. et al., U.S. patent application 2002/0092340, published July 18, 2002.

Applicants show below that Prater et al., the cited prior art, is not the same as any of independent claims 1 and 31 as here amended, and therefore does not anticipate these claims and the claims that depend directly or indirectly from these claims.

Prater, C. et al., U.S. patent application 2002/0092340, published July 18, 2002

Prater shows an integrated cantilever sensor array system with a cantilever sensor measurement head, having at least one cantilever, a light source and a detector positioned to detect incoming light reflected by the cantilevers within the cantilever array. The measurement chamber includes a flow cell and the cantilever sensor array is mounted within the flow cell.

Prater describes prior art in paragraph [0011] as published that has an array of VCSELs to distinguish from that art, and in paragraph [0013] problems with flow cells, i.e., dead volumes being too large, and molecules getting trapped in dead volumes of prior flow cells.

To avoid the problems of the prior art, Prater arranges a light source that illuminates an object of interest at a specific angle compared to the plane of the reflective surface of the microcantilever, and a position sensitive detector (PSD) to which light is reflected at a similar angle, to obtain reflected light from the cantilever.

Prater's special angle arrangement is shown clearly and repeatedly in Figs. 2, 3, 4, 5, 17b, 17c, 19, and illustrated most clearly in Fig. 7, which labels the laser and the PSD. The required special angle of the light source compared to the cantilever surface and the same angle of the PSD is very important to Prater's device, as evidenced in Prater's paragraphs [0135] and [0148].

Another feature of Prater's device is illustrated in Fig. 11, showing sample cantilever #2, in which the sample under study is coated; and adjacent cantilever #1 which is a reference cantilever and is shown not so coated. Prater's cantilevers are present in a flow cell which

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contains a single sample that enters and exits through ports. The two differently configured cantilevers project from a surface of the flow cell into the sample fluid. Complex mathematics are used to distinguish observed curves of oscillations of these two cantilevers as shown in Figs. 11 and 12.

Clearly, Prater's flow cell is not the same as the microcantilevers in a microfluidics device that is the subject matter of claims 1 and 31 as here amended.

Finally, Prater's apparatus requires a Self Resonance circuit consisting of a feedback loop connecting the cantilever detection signal and the oscillation transducer, as described in paragraphs [0092] to [0093] of this reference. For this system to work, a 90 degree phase shift between the oscillation transducer and the oscillating cantilever must be maintained. See paragraph [0094]. See Prater, paragraphs [0108]-[0122].

For any of the above reasons, Prater is not the same as the subject matter of claims 1, 14 and 31 as originally filed, or as claims 1 and 31 as here amended.

The criterion for rejection of claims under 35 U.S.C. §102 is identity. As Prater is not identical to the subject matter of claims 1 and 31, therefore these claims are novel in view of this reference. Claims 2-3 and 5-4, and 32, respectively, which incorporate all of the subject matter of claims 1 and 31 from which they depend, are also novel in view of Prater.

Nevertheless, claims 1 and 31 are here amended to expedite a finding of allowability. Claims 1 and 31 as here amended include the subject matter of claim 4. As claim 4 was not rejected in view of Prater, then claims 1 and 31 as here amended are novel for this reason also.

Applicant respectfully requests that rejection of claims 1-3, 5-6 and 31 and 32 for anticipation in view of Prater be withdrawn.

Claims as amended are non-obvious

The Office action on page 3, paragraph 5 rejects claims 31, 33-43 and 45-51 as obvious under 35 U.S.C. §103 (a) over Webb, C. et al., U.S. patent number 5,563,710, issued October 8, 1996.

Webb et al., U.S. patent number 5,563,710 issued October 8, 1996

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Webb describes a laser scan drive attached to a photodetector as components for a scanning microscope, using an array of lasers, for optical instruments and methods. Most important, Webb's device images an object. See Webb et al., Abstract lines 4-7. This reference is replete with phrases such as, "...object to be imaged..", "...image of the object..." and "...object of interest...". The scanning microscope in Webb clearly is used to view one object, and creates an image of that object. There are no detectors and no microfluidics devices in Webb et al., and these words do not even appear anywhere in this reference.

Most important, Webb states that, "...an object of the present invention is to provide an improved confocal laser imaging system that requires no moving parts." Ibid., column 2 lines 41-43 [emphases added].

Further, as a single reference per se, Webb does not render these claims obvious for the following reasons.

Webb fails to teach or suggest any laser or any array of lasers is used to illuminate any detector, let alone a plurality of detectors, which is the subject matter of claim 31 as originally filed, let alone detectors that are microcantilevers within a microfluidics device, which is the subject matter of claim 31 as here amended.

Webb clearly fails to teach or suggest the subject matter of claim 31 as originally filed or as here amended, and therefore fails to teach or suggest the subject matter of claims 33-43 and 45-51, that depend directly or indirectly on claim 31.

Claim 31 is here amended in order to expedite a finding of allowability of this claim and claims that depend from it.

Claim 31 as here amended is directed to an illuminator of detectors that are an array of microcantilevers within a microfluidics device, and incorporates the subject matter of claim 32 as originally filed, which was not rejected in view of Webb.

Webb et al. fails to teach or suggest any detectors, which is the subject matter of claim 31 as originally filed, let alone any detectors that are microcantilevers, which also is the subject matter of claim 31 as here amended.

Further, it would have been well known to one of ordinary skill in the art of sensors and detectors at the time the present application was filed, that microcantilevers act as

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detectors by moving or oscillating in response to binding of a material to be detected. For this reason, Webb et al. actually teaches away from the claims as here amended, because it is an object of Webb to provide a system that requires no moving parts.

Claims 33-43 and 45-51 depend directly or indirectly on claim 31, and include all of the subject matter of claim 31 and additional subject matter. As claim 31, both as originally filed and as here amended, is not obvious in view of Webb et al., then claims 33-43 and 45-51 also are not obvious.

For any of the above reasons, Applicants respectfully request that rejection of claims 31, 33-43 and 45-51 under 35 U.S.C. §103(a) in view of Webb be withdrawn.

The Office action on page 6, paragraph 7 rejects claims 4, 7-30, 32 and 44 as obvious under 35 U.S.C. §103 (a) over Prater in view of Webb, C. et al.

Claim 4 is here canceled, therefore rejection of this claim is moot. Claim 1 is here amended to incorporate the subject matter of claim 4. Claims 7-13 which depend directly or indirectly from claim 1 are likewise amended to incorporate the subject matter of claim 4.

Applicants note that claims 1 and 31 as originally filed do not stand rejected under 35 U.S.C. §103 (a) over Prater in view of Webb, C. et al. Therefore these claims as here amended, which contain additional subject matter, also are not obvious in view of the combination of these references. Further, claims 7-13 which depend directly or indirectly from claim 1 and incorporate the amendment as made herein to claim 1, are likewise not obvious in view of the combination of these references.

Claim 31 is here amended to incorporate the subject matter of claim 32, which is further amended according to an embodiment of the invention in which the plurality of VCSELs is about the same in number of the microcantilevers in the array. Claim 44 is here amended to include that the VCSELs are a plurality. Applicants assert that claims 32 and 44 as here amended are not obvious in view of in view of the combination of these references.

Applicants offer the following reasons that claim 14 and its dependent claims 15-30 are not obvious in view of this combination of references.

According to the MPEP §2143:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the

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references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). [emphases added]

As a preliminary matter, Applicants point out that Prater, the more recent of these references, is devoid of any reference to or citation of Webb et al. therefore Prater fails to teach or suggest a combination with Webb, and cannot teach or suggest that making such a combination would have been successful. Therefore the first and second requirements of a prima facie case of obviousness, that there be a suggestion or motivation to make the subject matter of the claims, and that there would have been a reasonable expectation of success were the combination to have been made, are not satisfied by the combination of Prater and Webb. Therefore on this basis alone, a prima facie case of obviousness of claims in view of these two references has not been made.

The third requirement is that all of the claim limitations be taught by the references. As shown above, neither of Prater nor Webb teaches that detectors be within a microfluidics device.

Claim 14 is directed to an apparatus for reading an array of detectors in a microfluidics device, and the housing of the apparatus has an opening to receive the microfluidics device.

Neither of Prater nor Webb teaches or suggests a microfluidics device, let alone an apparatus for reading an array of detectors that is within a microfluidics device, or that has a housing with an opening to receive a microfluidics device.

Therefore by any of these criteria alone, claim 14 is not obvious in view of the combination of these references. Claims 15-30 that depend directly or indirectly from claim 14 and include all of the subject matter of this claim and have additional subject matter, also are not obvious.

Rejecting claim 14 and its dependent claims in view of Prater and Webb, when there is no teaching or suggestion in these references of a microfluidics device, nor to make the

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combination with other, nor that it would be successful, is impermissible hindsight using Applicant's application as a blueprint to attempt to reconstruct the claims.

Therefore by these criteria, claims 7-30, 32, and 44 would not have been obvious to one of ordinary skill at the time the present application was filed, in view of the combination of these references.

Applicants respectfully request that the rejection of these claims under 35 U.S.C. §103(a) in view of the combination of Prater and Webb be withdrawn.

Claims as amended comply with 35 U.S.C. §112 ¶2

Claims 1-19, 32 and 44 are rejected for various reasons. Claims are here amended to address these issues as follows.

Claim 1 is here amended to replace "with" by —using— as suggested in the Office action. This claim and pending claims 2-3 and 5-19 that depend from claim 1 therefore meet the requirements of 35 U.S.C. §112 ¶2 and this rejection can properly be withdrawn.

Claim 1 is here amended to include the term, "microfluidics", therefore rejection of claim 8 as lacking antecedent basis is moot and this rejection can properly be withdrawn.

Claim 31 is here amended to include the term, "microfluidics", therefore rejection of claim 32, which is further amended, is moot and this rejection can properly be withdrawn.

Claim 44 is here amended to change the word, "the" to —a—. Therefore this claim meets the requirements of 35 U.S.C. §112 ¶2 and this rejection can properly be withdrawn.

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Summary

On the basis of the foregoing amendments and reasons, Applicants respectfully submit that the pending claims are in condition for allowance, which is respectfully requested.

If there are any questions regarding these remarks, the Examiner is invited and encouraged to contact Applicants' representative at the telephone number provided.

Respectfully submitted,

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